VIBRIO INFECTIONS SURVEILLANCE IN MARYLAND

2005-2013

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Maryland Department of Health and Mental Hygiene
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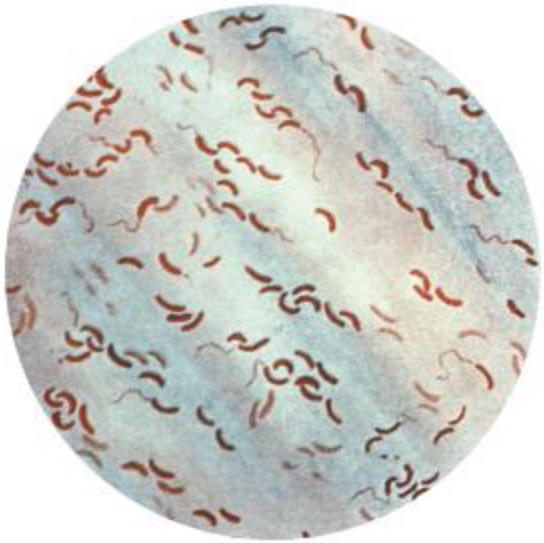
Agenda

- Background
  - Maryland Surveillance System
  - Maryland Vibrio rates 2005-2013
  - Distribution by county
  - Breakdown by Species
- Transmission Route
  - Foodborne
  - Non-foodborne
- Outreach



This Gram-stain depicts flagellated *Vibrio comma* bacteria, a strain of *V. cholerae*.

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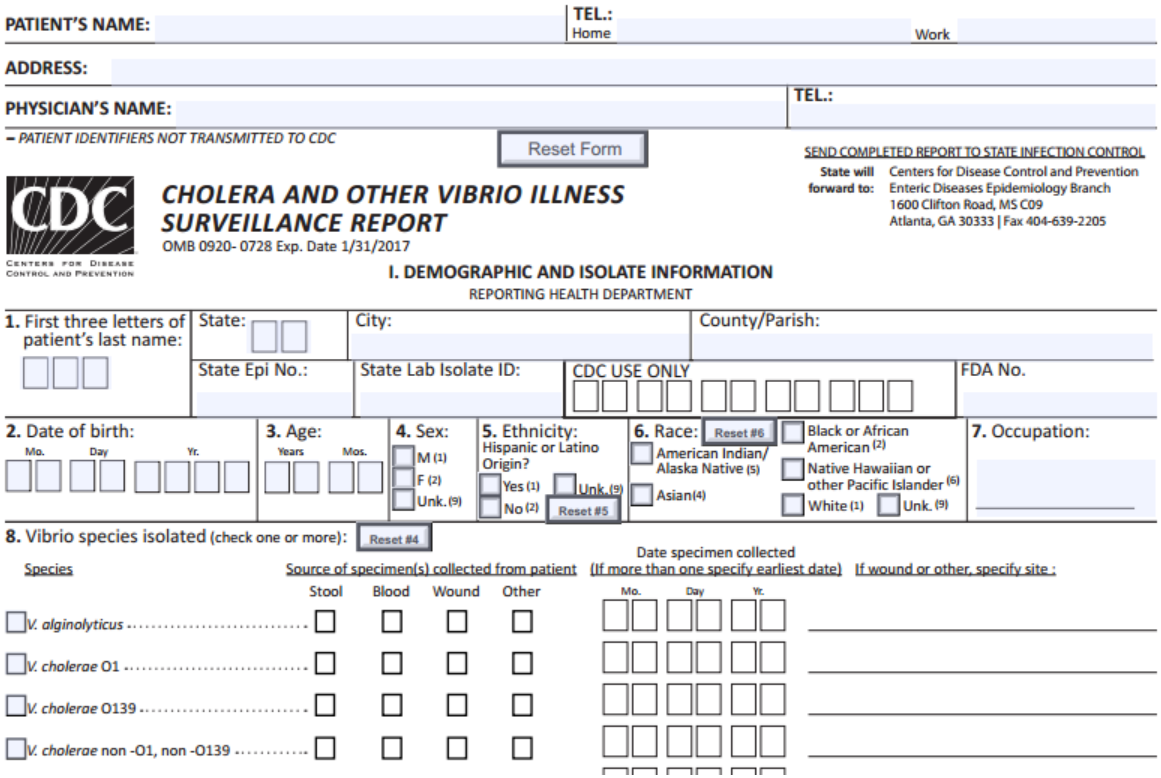


PATIENT'S NAME: | TEL.: Home | Work

ADDRESS:

PHYSICIAN'S NAME: | TEL.:

– PATIENT IDENTIFIERS NOT TRANSMITTED TO CDC

Reset Form

SEND COMPLETED REPORT TO STATE INFECTION CONTROL

State will forward to: Centers for Disease Control and Prevention
Enteric Diseases Epidemiology Branch
1600 Clifton Road, MS C09
Atlanta, GA 30333 | Fax 404-639-2205

CDC
Centers for Disease Control and Prevention

CHOLERA AND OTHER VIBRIO ILLNESS SURVEILLANCE REPORT

OMB 0920- 0728 Exp. Date 1/31/2017

I. DEMOGRAPHIC AND ISOLATE INFORMATION

REPORTING HEALTH DEPARTMENT

1. First three letters of patient's last name: | State: | City: | County/Parish:

State Epi No.: | State Lab Isolate ID: | CDC USE ONLY | FDA No.

2. Date of birth: Mo. Day Yr.

3. Age: Years Mos.

4. Sex: M (1) F (2) Unk. (9)

5. Ethnicity: Hispanic or Latino Origin? Yes (1) No (2) Unk. (9) Reset #5

6. Race: Reset #6 American Indian/ Alaska Native (5) Asian (4) Black or African American (2) Native Hawaiian or other Pacific Islander (6) White (1) Unk. (9)

7. Occupation:

8. Vibrio species isolated (check one or more): Reset #4

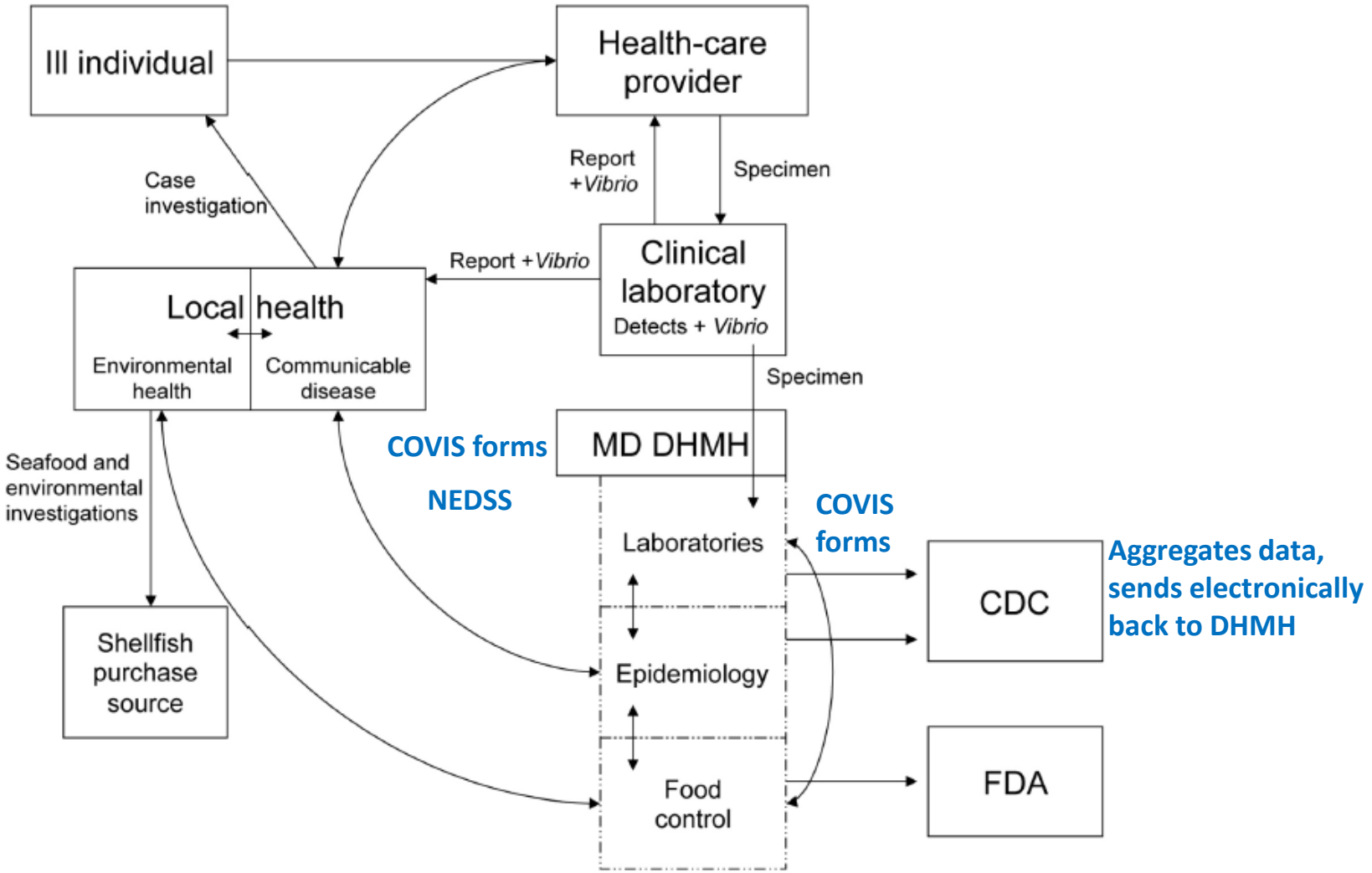
Species	Source of specimen(s) collected from patient: Stool	Blood	Wound	Other	Date specimen collected (If more than one specify earliest date): Mo. Day Yr.	If wound or other, specify site :
V. alginolyticus						
V. cholerae O1						
V. cholerae O139						
V. cholerae non -O1, non -O139						

NEDSS/NBS

The National Electronic Disease Surveillance System (NEDSS) facilitates electronically transferring public health surveillance data from the healthcare system to public health departments. It is a conduit for exchanging information that supports NNDSS. Today, when states and territories voluntarily submit notifiable disease surveillance data electronically to CDC, they use data standards and electronic disease information systems and resources supported in part by NEDSS. This ensures that state data shared with CDC are submitted quickly, securely and in an understandable form.

NEDSS helps connect the healthcare system to public health departments and those health departments to CDC by

Figure 1. The *Vibrio* surveillance system, Maryland, 2002–2008



MD DHMH = Maryland Department of Health and Mental Hygiene
CDC = Centers for Disease Control and Prevention
FDA = Food and Drug Administration

Adapted from Jones Erin et. al *Vibrio* Infections and Surveillance in Maryland, 2002-2008. *Public Health Reports.* Nov-Dec 2013/ Vol. 138.

Vibrio

- Gram-negative bacteria
  - Occurs naturally in the marine environment
- Accounts for:
  - 80,000 illnesses, 500 hospitalizations, 100 deaths each year in the US
- Transmission from:
  - Seawater or consumption of raw or undercooked seafood
- Symptoms:
  - Diarrhea, septicemia, wound infections

National data non-cholera *Vibrio* infections

US (2005-2012):

- 6019 Infections Incidence Rate= 1.95/100,000 pop.

US (2012):

- 944 Vibrio infections; Incidence Rate= 0.3/100,000 pop.
  - 35% were hospitalized
  - 6% died

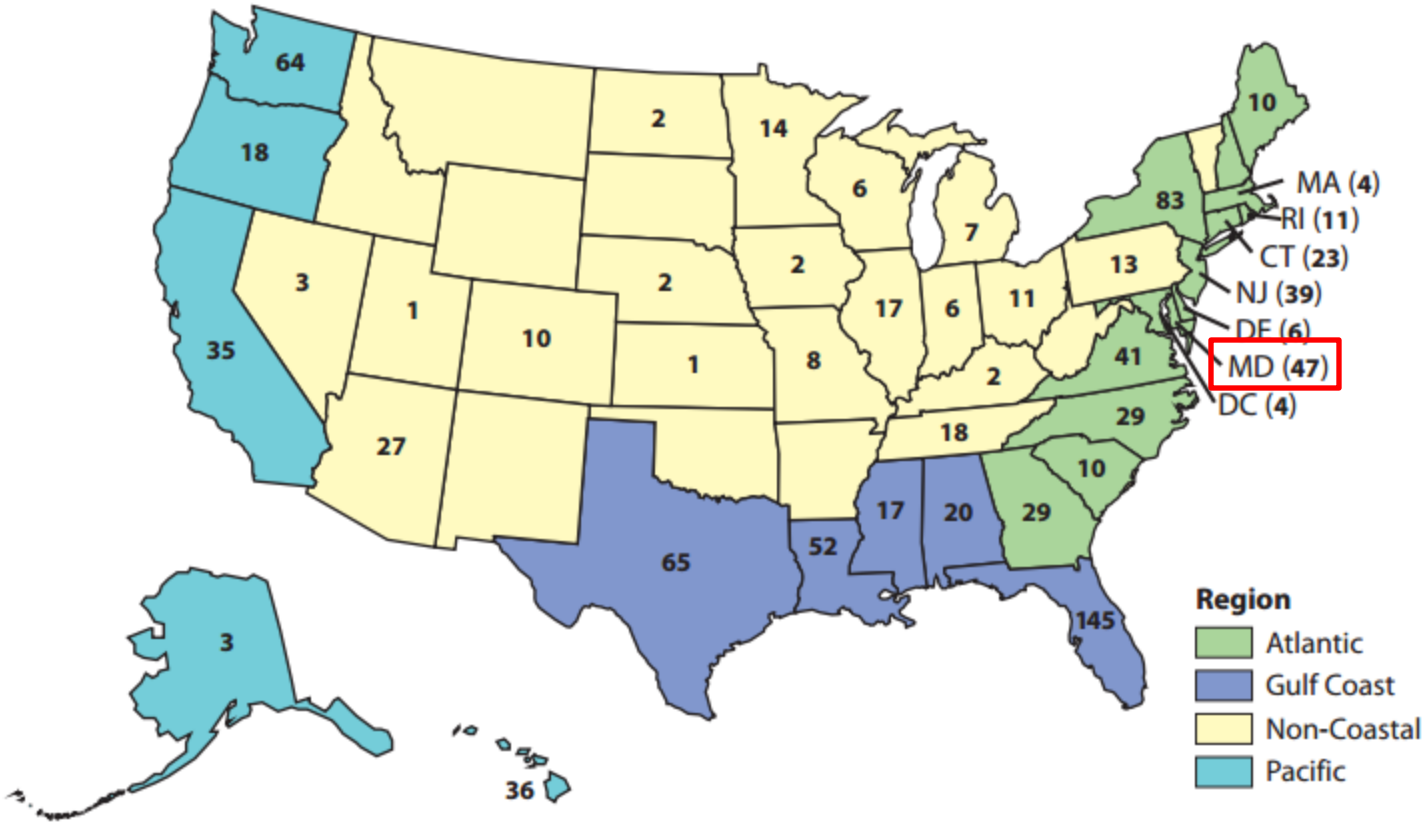
- 45%= *V. parahaemolyticus*
  - Of those with information 25% hospitalized and 2% died

- 14% = *V. vulnificus*
  - Of those with information 86% hospitalized and 30% died

US 2012 population estimate. United States Census Bureau. https://www.census.gov/population/international/data/idb/region.php?N= %20Results %20 &T=13&A=separate&RT=0&Y=2012&R=-1&C=US. [Accessed Dec 16, 2014].

Geographic Distribution

Figure 1. Number of cases of *Vibrio* infections (excluding toxigenic *V. cholerae* O1 and O139), by state, 2012 (N=944 from 42 states).



-Most frequent *Vibrio* species reported

V. parahaemolyticus

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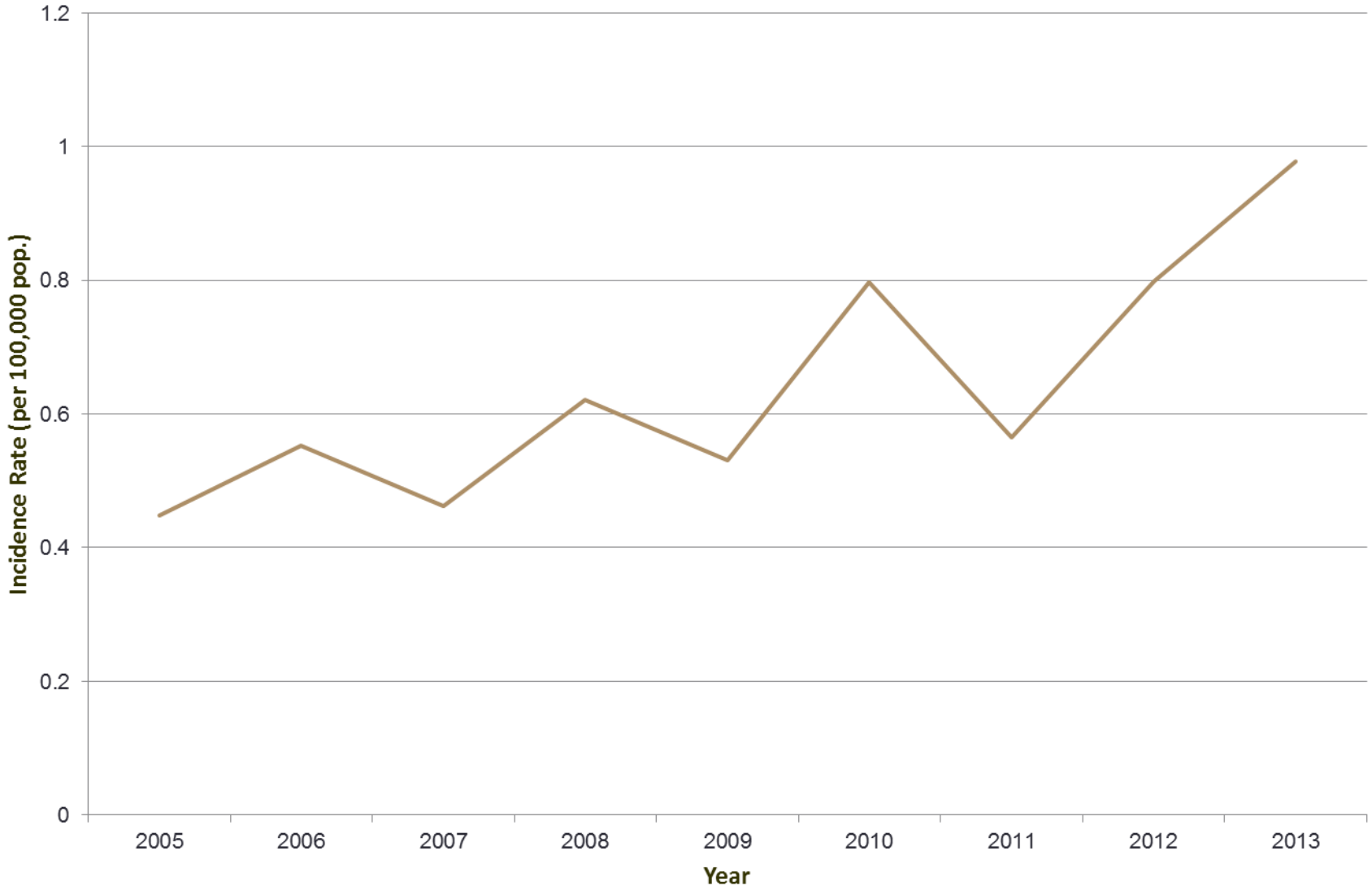
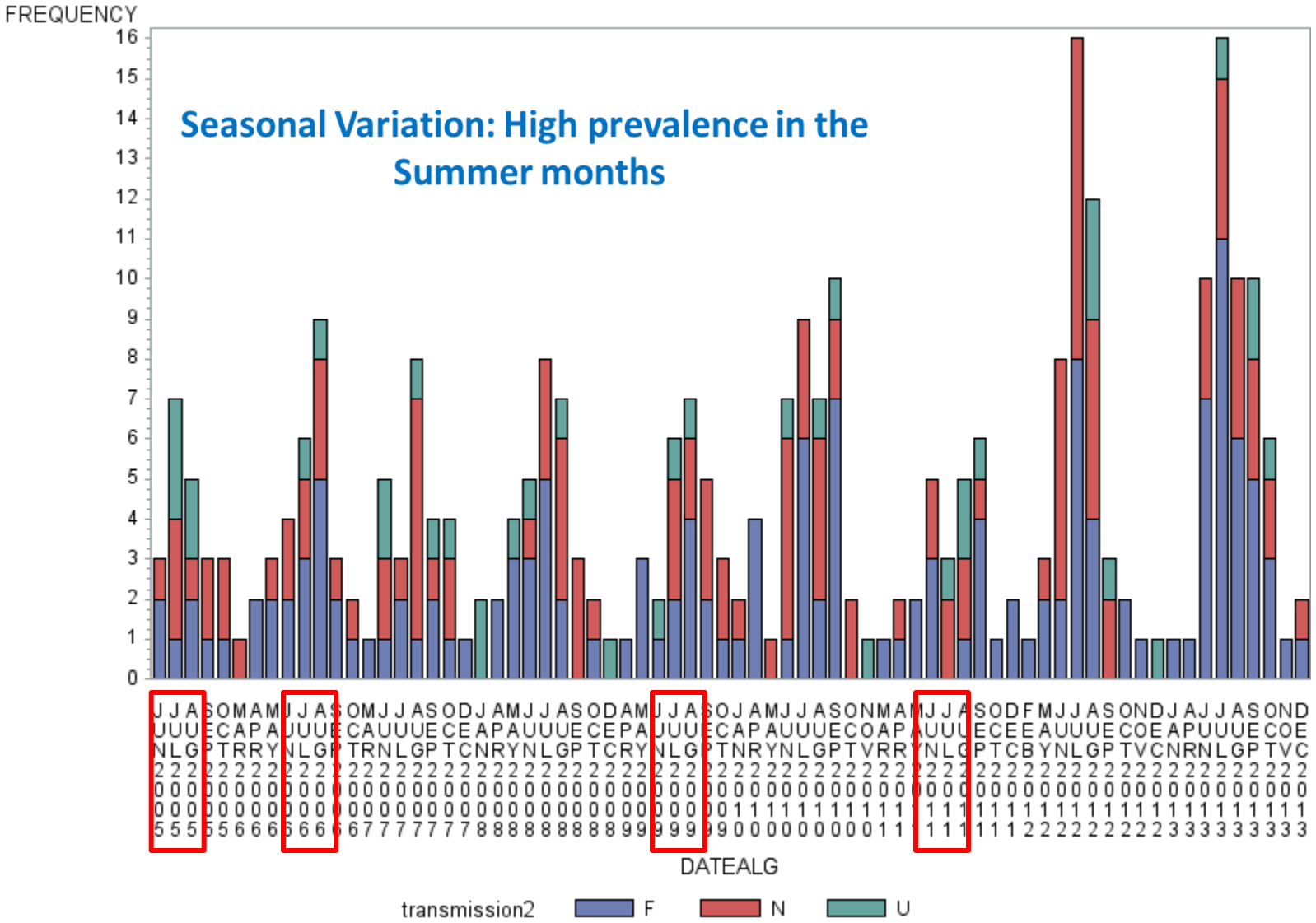
Incidence Rate of all non-cholera *Vibrio* infections in Maryland, 2005-2013



Source: Rates based on Maryland census data.

Epidemic Curve of Vibrio Cases from 2005 to 2013 by Month and Year



Demographics

Category	Cases N=331	
Sex (N=329)		
Male	231	70.2%
Female	98	29.8%
Age (N=330)		
0 to <20 years	47	14.2%
≥ 20 to < 40	54	16.4%
≥ 40 to <60	103	31.2%
≥ 60 to <80	98	29.7%
≥ 80 years	28	8.5%
Race (N=323)		
White	230	71.2%
Black or African American	66	20.4%
Native Hawaiian or Pacific Islander	2	0.6%
Asian	11	3.4%
American Indian or Alaska Native	0	0%
Unknown	14	4.3%

Vibrio Infections in Maryland by County of Residence, 2005-2013

COUNTY	NUMBER OF CASES N=326	INCIDENCE (per 100,000)
ALLEGENY	0	0
ANNE ARUNDEL	63	11.72
BALTIMORE	51	6.34
BALTIMORE CITY	34	5.48
CALVERT	16	18.03
CAROLINE	3	9.07
CARROLL	8	4.79
CECIL	6	5.93
CHARLES	17	11.60
DORCHESTER	6	18.39
FREDERICK	5	2.14
HARFORD	13	5.31
HOWARD	16	5.57
KENT	1	4.95
MONTGOMERY	23	2.37
PRINCE GEORGE'S	17	1.97
QUEEN ANNE'S	7	14.64
SAINT MARY'S	9	8.56
SOMERSET	10	37.78
TALBOT	7	18.53
WASHINGTON	2	1.36
WICOMICO	9	9.12
WORCESTER	3	5.83

Vibrio Infections in Maryland, 2005 - 2013

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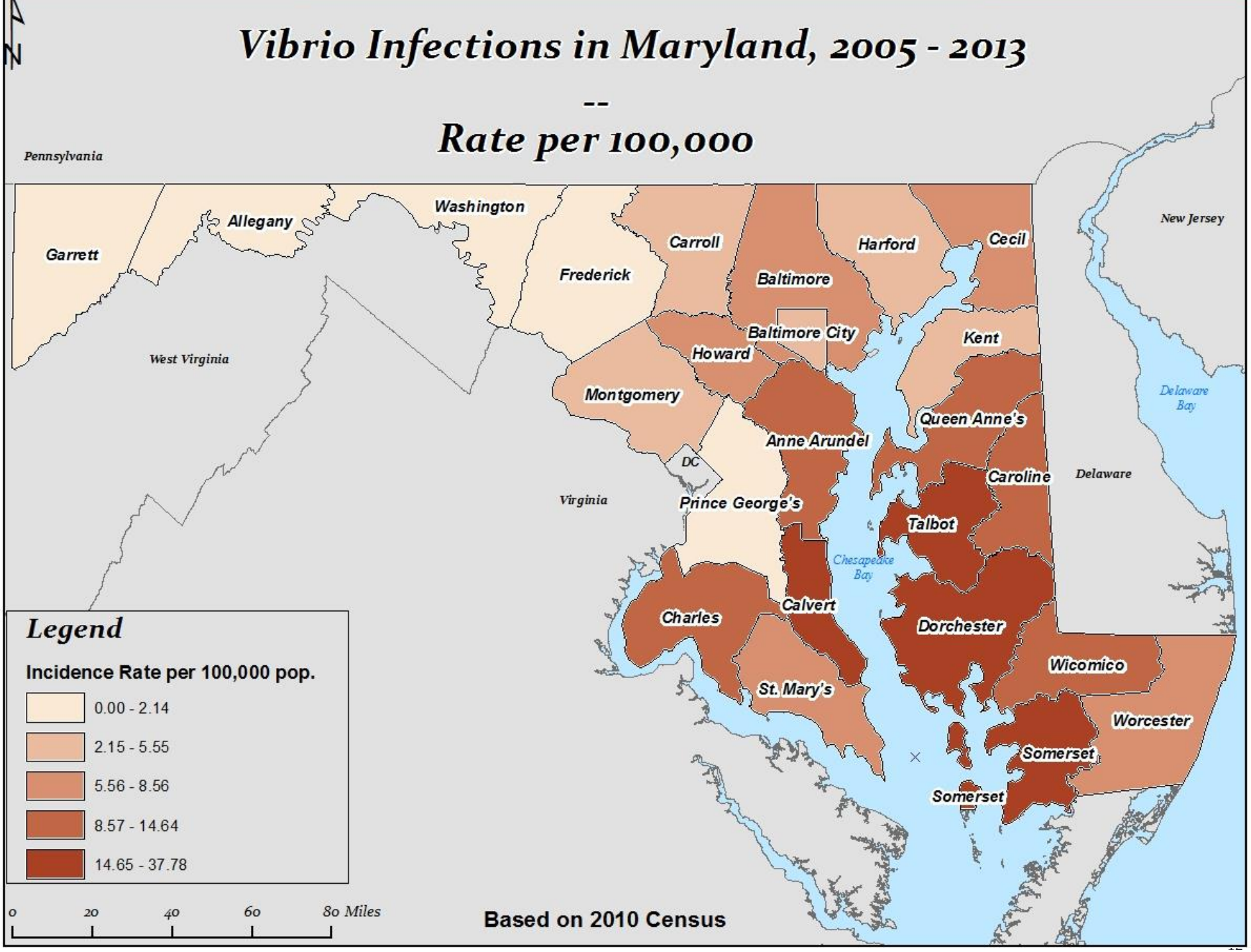
Rate per 100,000



Maryland non-cholera *Vibrio* infections by Species, 2005-2013

Species	Number of cases (%) N=331	
V. parahaemolyticus	129	38.9%
V. vulnificus	80	24.2%
Other *Vibrio* species	121	36.6%
Missing	1	0.3%
TOTAL	331	

Breakdown of "Other *Vibrio*"

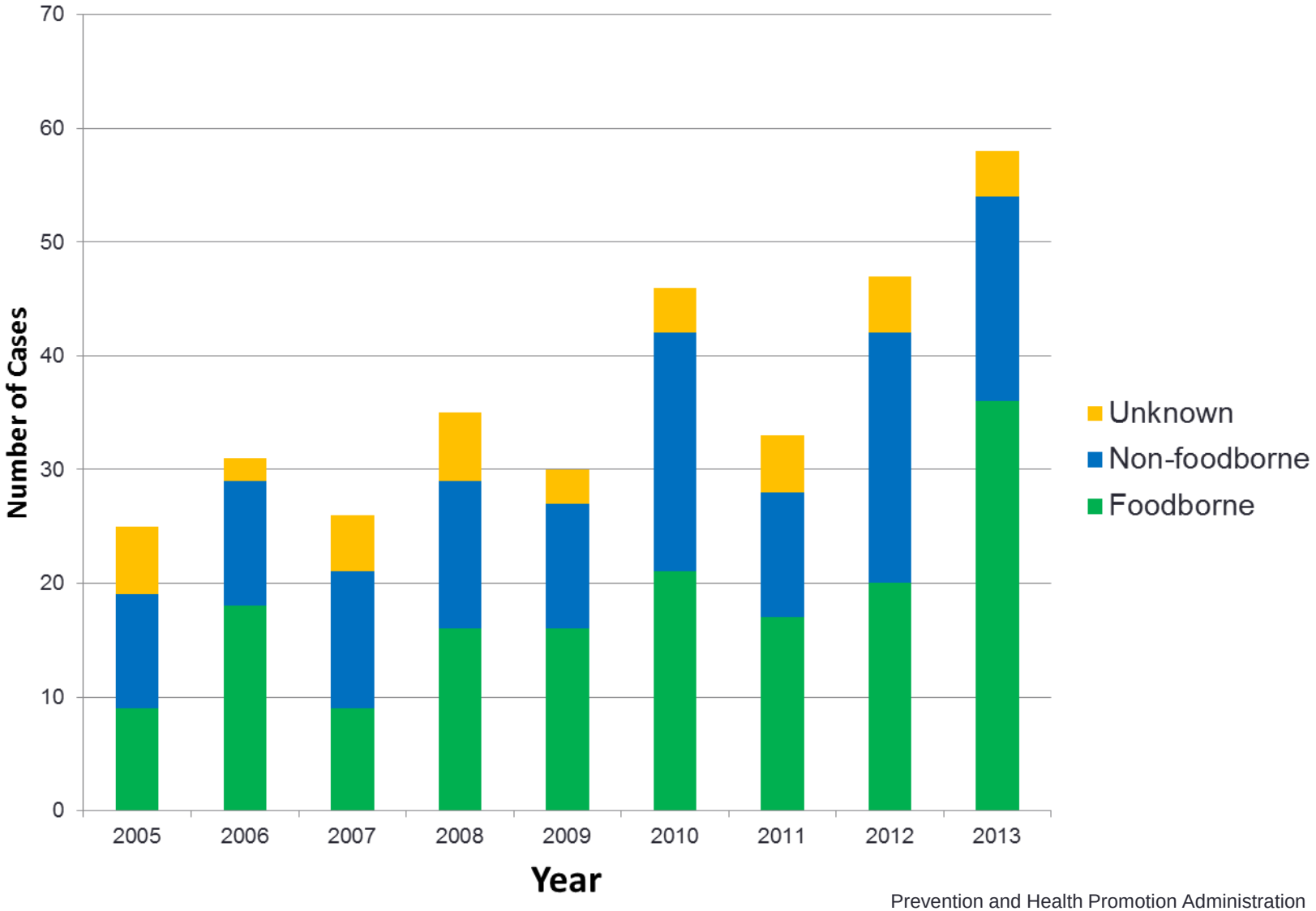
Other	Species	Number N=121	
	V. alginolyticus	42	34.7%
	V. fluvialis	23	19.0%
	V. cholerae nonO-1, nonO139	18	14.9%
	Not Identified	17	14.1%
	Multiple	8	6.6%
	V. hollisae	4	3.3%
	V. mimicus	3	2.5%
	Other	2	1.7%
	V.damsela	2	1.7%
	V.furnissii	1	0.8%
	V.metschnikovii	1	0.8%

Maryland non-cholera *Vibrio* infections by Transmission Route, 2005-2013

Transmission Route	Cases N= 331	
Foodborne=	**162**	49%
Confirmed foodborne	153	46%
Probable foodborne	9	3%
Non-foodborne	**129**	39%
Confirmed non-foodborne	118	36%
Probable non-foodborne	11	3%
Unknown	**40**	12%

* Based on Maryland covis data. "National Enteric Disease Surveillance: COVIS Annual Summary, 2012. http:// www.cdc.gov /ncezid/dfwed/pdfs/covis-annual-report-2012-508c.pdf

Non-cholera Vibrio infections in Maryland by Transmission Route, 2005-2013



Demographics by Transmission Route

Demographics	Foodborne Cases N= 162		Non-Foodborne N=129	
Sex (N=329)				
Males	103	64.0%	98	76.6%
Females	58	36.0%	30	23.4%
Age (N=330)				
0 to <20 years	4	2.5%	41	31.8%
≥ 20 to < 40	35	21.7%	15	11.6%
≥ 40 to <60	65	40.4%	27	20.9%
≥ 60 to <80	45	28.0%	37	28.7%
≥ 80 years	12	7.5%	9	7.0%
Race (N=323)				
White	97	61.0%	105	82.7%
Black or African American	44	27.7%	15	11.8%
Asian	8	5.0%	2	1.6%
Native Hawaiian or Pacific Islander	2	1.3%	0	0%
Unknown	8	5.0%	5	3.9%

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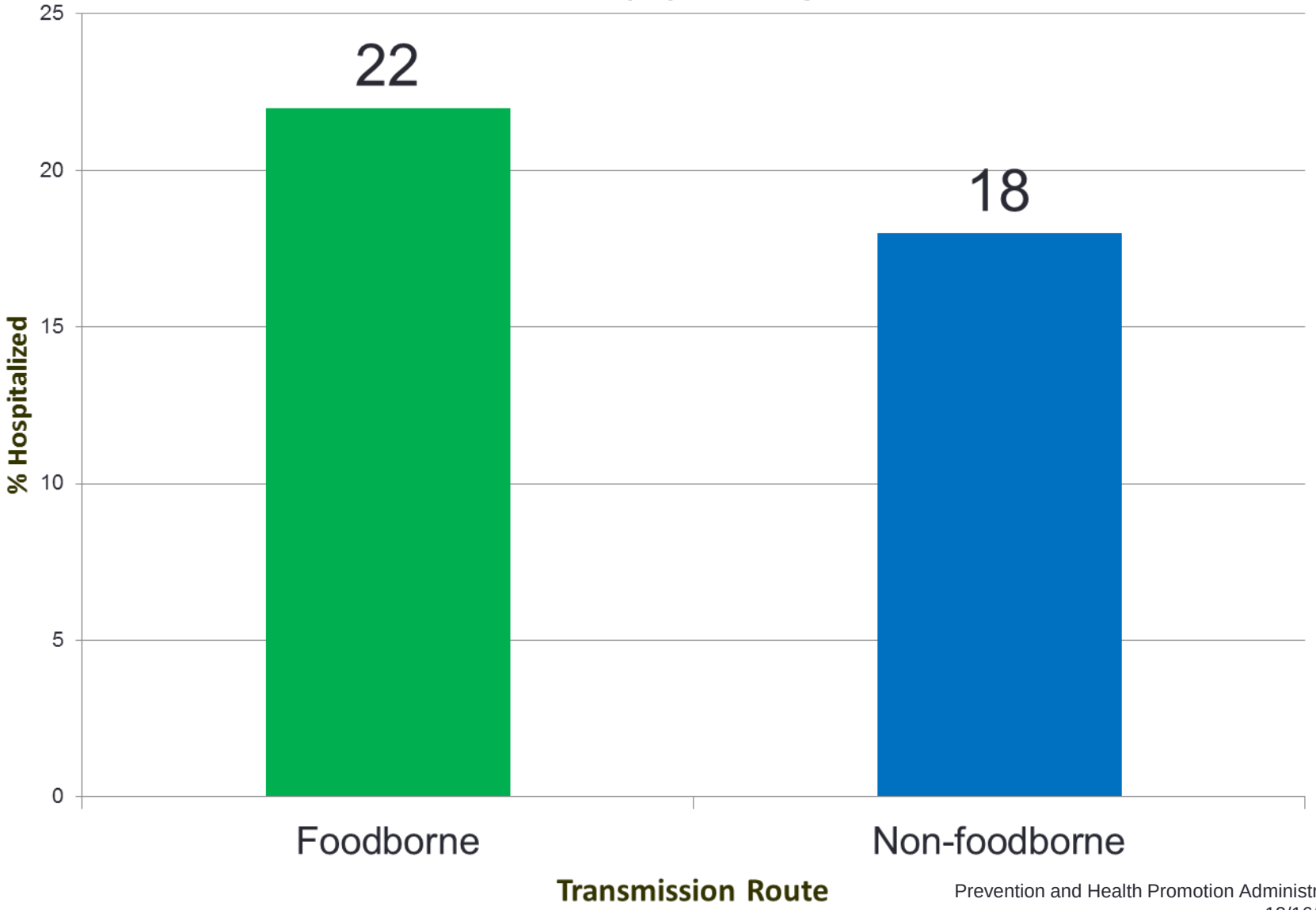
Non-cholera *Vibrio* infections resulting in hospitalizations(%) in Maryland, 2005-2013



Non-cholera *Vibrio* Infections in Maryland, 2005-2013

Foodborne:

40% Reported eating single seafood item

Food	Number N=162	
Crabs	29	17.9%
Oyster	21	12.9%
Fish	6	3.7%
Shrimp	5	3.1%
Clams	3	1.9%
TOTAL	**64**	**40%**

Non-cholera *Vibrio* infections in Maryland, Foodborne exposure, 2005-2013

Total Cases= 162

#1= Crabs

#2= Oysters

*Limitations:

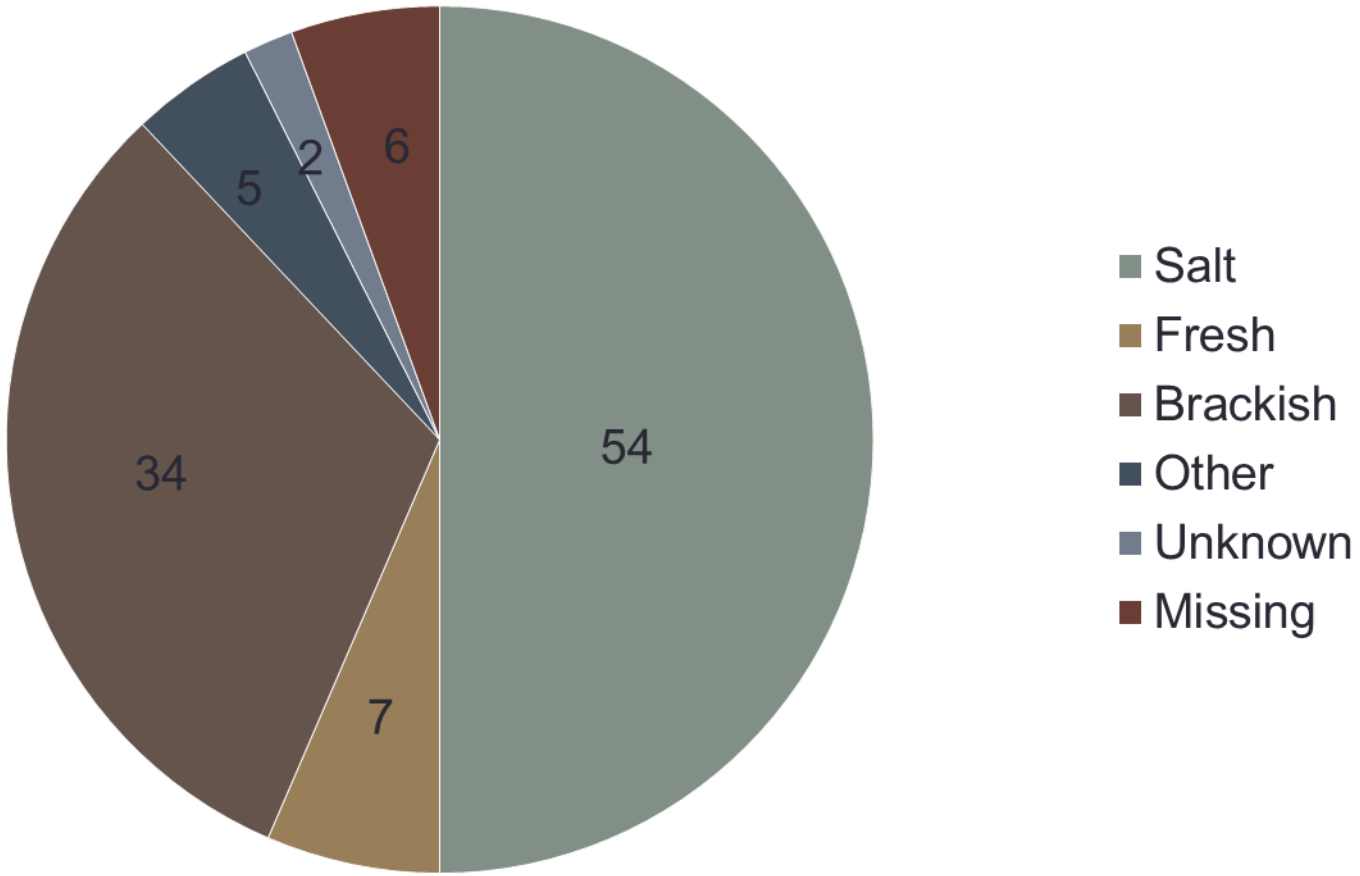
- Difficult to pinpoint source as people often consumed multiple types of seafood
- People could only report one date of consumption
- Limited data on Foodborne exposures
  - Ex: Shipping Tag data- ~70% of data either unknown or missing
  - Ex: Storage data- ~80% data either unknown or missing

Non-cholera *Vibrio* Infections from Non-foodborne exposure in Maryland, 2005-2013

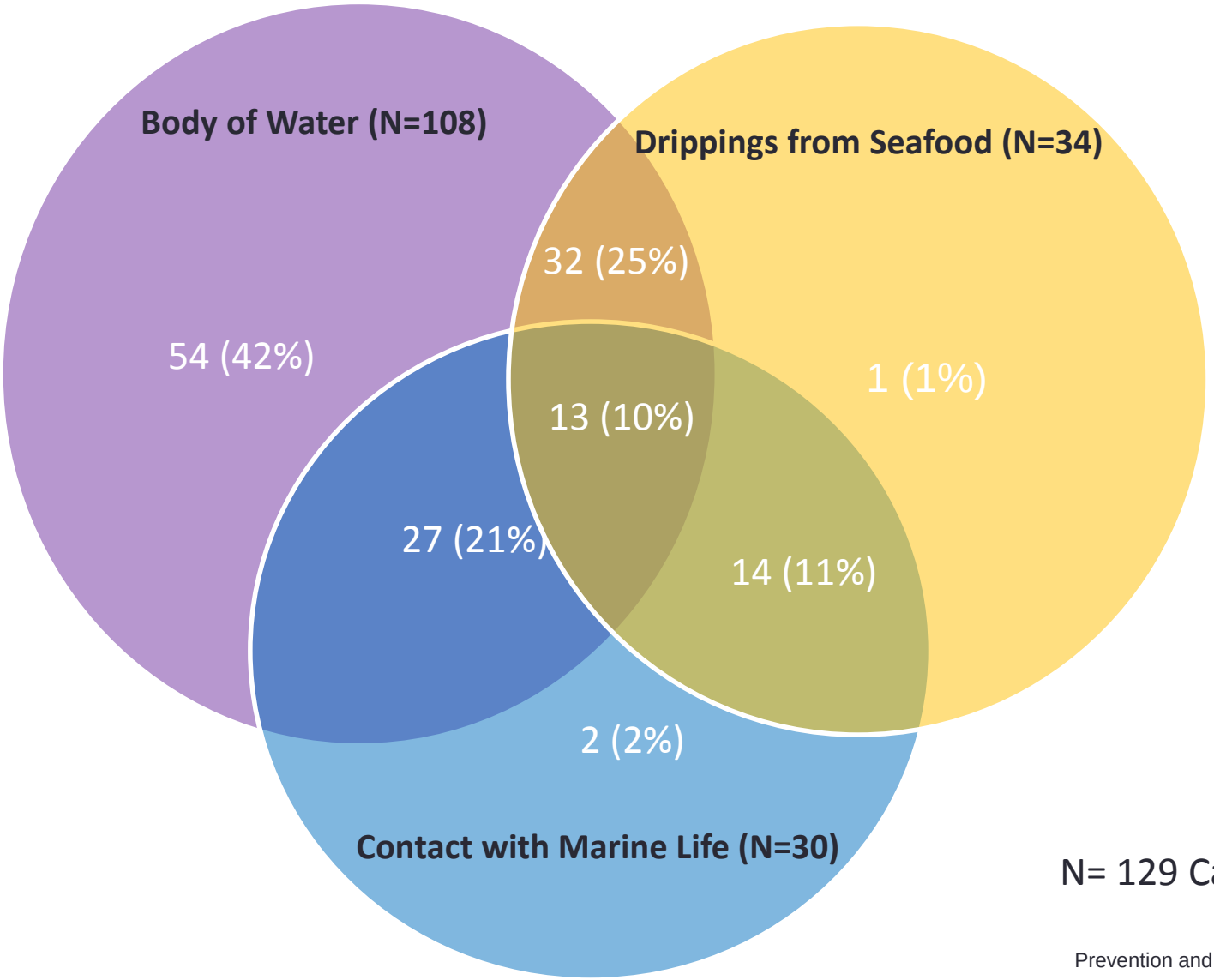
	Body of Water N= 129		Dripping from Seafood N= 129		Contact with other Marine Life N= 129	
Yes	108	84%	34	26%	30	23%
No	11	9%	70	54%	64	49%
Unknown	10	8%	17	13%	20	16%
Missing			*8*	*6%*	*15*	*12%*

>50% due to Swimming

Water type in Non-foodborne exposure cases in Maryland, 2005-2013 N=108



Non-foodborne exposure in Maryland, 2005-2013



N= 129 Cases

Non-foodborne exposure in Maryland, 2005-2013

Wound Details

* In those that were exposed to a body of water..

Wound	Cases N=108		Types of Wound	Cases N=108	
Yes	81	75%	**Yes, sustained a wound**	39	36%
			Yes, preexisting wound	38	35%
			Yes, uncertain if new or old	4	4%
No	20	19%	**No**	20	19%
Unknown	7	6%	**Unknown**	5	5%
			Missing	*2*	*2%*

Outreach

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Marylanders' Guide to Skin Wounds and Water Contact

Vibrio are bacteria that naturally occur in brackish water like the Chesapeake Bay and its tributaries, and in salt water, especially during warm weather months.

Vibrio infections are rare. However, when *Vibrio* comes into contact with an open wound, it can cause serious infections characterized by unusual redness, swelling and drainage. This can be particularly dangerous for people with weakened immune systems.

PROTECT YOURSELF AGAINST

- Avoid water contact if you hav
- If water contact cannot be avc
- Clean wounds immediately wi and clean water are not availa as soon as possible.
- Wear water shoes to avoid cu
- Wear gloves and use extra car
- Always shower after swimming handling food or eating.

Avoiding Infection

The only way to prevent infection is to avoid contact with the water. When water contact through swimming, working, or fishing cannot be avoided:

water contact can be cleansed immediately

feet

experiences signs of skin infection, such as
ealth care provider.

Cooking Shellfish

Shellfish should be cooked thoroughly to avoid health risks from Vibrio bacteria. Vibrio bacteria do not change the appearance, taste, or odor of oysters or clams. Only thoroughly cooking the oysters or clams will destroy the bacteria and eliminate the risk of infection:

- Live oysters or clams should be boiled three to five minutes after their shells open.
- Using a small pot to boil or steam oysters is recommended for thorough cooking.
- Discard any oysters that do not open during cooking.
- Shucked oysters or clams should be boiled or simmered at least three minutes or until the edges curl.
- They may also be fried in oil for three minutes at 375 degrees, broiled three inches from the heat for three minutes or baked in a 450 degree oven for 10 minutes.

Eating raw oysters or clams with hot sauce or while drinking alcohol does not destroy the bacteria. Anyone who works or swims in or catches any seafood from brackish bay waters or streams and rivers should thoroughly wash hands before cooking or eating.

Next Steps

- Improving the surveillance system to ensure complete and accurate documentation (ex: location of exposure)
- Targeted messages and education to public especially during the summer months about how to protect themselves from *Vibrio* infections
- Implications of climate change for *Vibrio* and HABs

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Questions?